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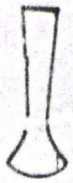

Developing An Avalanche Awareness System for Backcountry Users

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CLEMSON CLASS OF 1987

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Title: Developing An Avalanche Awareness System for Backcountry Users

Abstract: During the winter of 1986-87 eleven avalanche related deaths occurred in Colorado. The Regional Forester for the Rocky Mountain Region directed a a study of the Forest Service policy and procedures related to backcountry skiing. A team was formulated and recommendations were made. Two of the recommendations were to increase the education and awareness of the winter backcountry user and to develop a prototype system to classify avalanche hazards based on terrain factors. This system was developed by a committee made up of professionals who work in avalanche related fields.

The mapping of hazards related to slope angle were placed on one half of a bulletin board and general supporting information was placed on the other half. The bulletin boards were placed in two areas of high winter use. These two areas are also in moderate to high avalanche hazard.

The bulletin boards were evaluated and a recommendation will be made to the Regional Office to continue use of the system in the two locations used this winter. It will also be recommended that the system be made available for use on other Ranger Districts meeting the criteria for use.

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EXECUTIVE SUMMARY

Title: Developing An Avalanche Awareness System for Backcountry Users

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During the winter of 1986-87, 11 people died in avalanche related deaths in Colorado. Most occurred on National Forest land. Gary Cargill, Regional Forester for the Rocky Mountain Region, directed Richard Woodrow, Forest Supervisor of the White River National Forest, to review Forest Service policy and procedures related to backcountry skiing. Mr. Woodrow put together a team from the ski industry, law enforcement, search and rescue, and the Forest Service to accomplish this task. This author was a member of that group.

The team submitted its findings in August 1987. It recognized the need to increase the backcountry user's awareness level of avalanches. It recommended developing a system to classify avalanche hazards based on terrain factors and to use this system on a trial basis in a few areas of heavy use during the 1987-88 winter.

I asked Mr. Woodrow to let me develop the system to implement the recommendation and to fulfill my upcoming Clemson Short Course field project requirements. He agreed.

After returning from the Short Course, work began on the project. The objective was to develop an Avalanche Awareness System using interpretive bulletin boards. The boards would explained to backcountry users through maps, text and photos the avalanche hazards in the area they would be entering. The project was initiated by meeting with a group of key people in the avalanche community. At this meeting we fulfilled my objective of selecting a method for creating an Avalanche Awareness System and involving knowledgeable individuals in its development. Many of these same people would have a bearing on the system's acceptance.

A small group was selected to actually develop the system, using the method agreed upon in that first meeting. In a series of meetings, we developed the mapping system, color coding to show extent of avalanche hazard, supporting information, means of displaying it, and chose test locations. We selected red to indicate areas subject to high avalanche hazard; yellow to show intermittent hazards, and blue for areas where avalanches are unlikely.

At the same time, arrangements were made for the construction of the bulletin boards to display the information and drafted a marketing plan. The information developed by the group was divided into two distinct types, avalanche mapping and support information. U.S. Geological Survey (USGS)

quadrangle maps were color-coded to show the extent of avalanche hazard. The hazard was rated by slope angle, the only constant factor of avalanching. The group carefully selected the support information to complement the mapping. The mapping, support information, and weatherproof bulletin boards for mounting make up the Avalanche Awareness System.

The bulletin boards were placed in Castle Creek near Aspen and the Vail/Shrine Pass area in Summit County, Colorado. Both locations receive heavy backcountry use and experience moderate to high avalanche hazard.

The response of backcountry users to the Avalanche Awareness System was positive. As a result, the Regional Office in Denver is being asked to continue the system at the two sites and to consider other locations. A package of board materials, selection criteria for sites, and construction and placement guidelines will accompany the recommendation. Acceptance of the Avalanche Awareness System for the Rocky Mountain Region will be reviewed by the Director of Recreation and Lands this spring for Region-wide application.

CHAPTER 1 - INTRODUCTION

PROJECT DESCRIPTION

This field project was to develop an Avalanche Awareness System. The system includes an avalanche hazard rating using a color coded map and facts about avalanche hazards to support the mapping. It is also to educate the public about safe winter backcountry travel.

The tangible portion of this project was developing a method for rating avalanche hazards, then designing information bulletin boards incorporating this method as part of the overall Avalanche Awareness System. The bulletin boards were placed at two locations on the White River National Forest that receive heavy backcountry use with moderate to high avalanche hazard. The boards are prototypes for the Rocky Mountain Region to consider for future use at the two test locations and other areas within the Region.

The intangible part of this project focused on educating backcountry users to raise their awareness level of avalanche hazards. This was to be accomplished with the information boards and through a marketing plan to meet the needs of users and promote the system.

PROJECT SELECTION

This project was selected for three reasons.
First was need. Eleven avalanche related deaths occurred in Colorado during the 1986-87 winter. As a result, the Forest Service prepared a "Backcountry Report" (August, 1987) that reviewed policy and procedures for winter backcountry use. It also recommended changes and additions. For its part, the public overwhelmingly supported keeping the backcountry open in winter and told the Forest Service to take a more active role in educating the public on winter use of the National Forests. My project would complement the "Backcountry Report" by providing useful information (education) to the public.

Second was a desire to help the Forest Service foster winter backcountry awareness on a State and Regional level. A number of agencies and groups were cooperating to promote avalanche awareness in Colorado, and this project was part of those efforts.

Third was a desire to strengthen the Forest Service's role in the Aspen/Snowmass community. As Aspen Ranger District's winter sports administrator, I wanted to improve our relationship with the people performing avalanche related work.

PROJECT OBJECTIVES

1. Develop an Avalanche Awareness System that will benefit the backcountry user. (By educating users about the avalanche hazards of the terrain and providing other relative tips on winter backcountry travel, users can make informed judgments about backcountry travel.) The system will be consistent with Forest Service policy to "Enhance recreation experiences through a minimum of regulation and law enforcement."

2. Have a system that can be adopted by the Rocky Mountain Region for use at sites throughout the Region.

3. Demonstrate to the public and to the ski industry that the Forest Service is working to make winter backcountry travel safer by educating users about avalanches. (This can be accomplished by developing the system, installing it, and using the media to promote it. Enlisting the help of key people in developing the system will also provide support.)

4. Draw on the interest and expertise of the backcountry user and the avalanche community.

CHAPTER 2 - LITERATURE REVIEW

A number of references were chosen and are listed in the bibliography.

CHAPTER 3 - METHODOLOGY

Once the Avalanche Awareness System was selected as the field project, two alternatives for achieving it were apparent:(1) Do the project by myself; (2) select a broad-based group to help me.

Alternative 2 was chosen for a number of reasons: To develop a useful system there was a need for the experience and expertise of others to assure a quality product. The success of selling the project would be enhanced if the right people were included from the beginning (they would have part ownership). To demonstrate to the public and the ski industry that action was being taken on this problem, it was necessary to include some key people from those ranks. The group chosen would give me competent help to develop the system, but most of the mechanical parts could be done by myself.

MEETING ONE - OCTOBER 20, 1987

The people selected to attend this first meeting was done with some special objectives in mind, as stated below.

Attendees	Position
Jim Gregg	Winter Sports Administrator, Dillon Ranger District, White River National Forest. (Extensive background in winter sports, snow science, outdoor recreation, graduate of Clemson Short Course, and administrator of one of the most heavily used and potentially dangerous backcountry areas in the National Forest System.)
Dave Stark	District Ranger, Holy Cross Ranger District, White River National Forest. (Line Officer for District with many problem areas related to winter backcountry travel; very good at analyzing and solving problems; needed his understanding and acceptance of the project because part of the test area would be on the Holy Cross RD.)

John Korb	Winter Sports, Rocky Mountain Region. (Deals with both backcountry and developed ski areas; has many Statewide contacts with other organizations and agencies, and will be one of those reviewing this project for acceptance by the Regional Office; a Short Course graduate.)
Bob Miller	Recreation Staff, White River National Forest. (Extensive winter sports background, knowledgeable about the problem and the landscape within the WRNF; served as a key member of the team that developed the "Backcountry Report.")
Rick Jewell	Recreation and Lands, Holy Cross Ranger District. (Administers large portion of one of the likely locations for the prototype bulletin boards.)
Denny Bschor	Director of the Office of Information, Rocky Mountain Region. (Coordinator of much of the emphasis given to winter backcountry education within the State for the Forest Service and responsible for printing a Forest Service Winter Recreation Guide; graduate of the National Avalanche School and the Clemson Short Course.)
Chuck Tolton	Ski Patrol Director, Copper Mountain Ski Area. (Active member of the avalanche community in Summit County, Colorado; instructor at the National Avalanche School, and contributor to the "Backcountry Report.")
Knox Williams	Director, Colorado Avalanche Information Center (CAIC) Mountain meteorologist and snow scientist; respected internationally for his work in this field; presenter at several International Snow Science Workshops and co-author of "Snowy Torrents.")
Ken Kowynia	Winter Sports Administrator, Dillon Ranger District. (Experienced winter backcountry skier; served as Snow Ranger for Dillon District for several years; graduate of National Avalanche School, and active member of the avalanche community in Summit County, Colorado.)
Randy Herzberg	Winter Sports Administrator, Aspen Ranger District. (Nine years of Forest Service winter sports background; graduate of the Naticnal Avalanche School and Level II American Avalanche Institute course.)

The objectives for this meeting were (results of the objectives follow in parentheses):

* Explain Clemson project to group and show how it relates to "Backcountry Report" recommendations. (A copy of the project prospectus was handed out to each attendee. The objectives and how this project could help meet the "Backcountry Report" recommendations were explained.)

* Seek group's consensus to use project to develop a avalanche hazard rating method and include it with bulletin board information. (Group unanimously favored the project.)

* Develop evaluation criteria for a avalanche hazard rating method as a group so the project could proceed. (There was a need to determine how the rating system would be developed. This was done by developing selection criteria for alternatives. Next, the group listed six alternatives that could be made into a hazard rating system. Then a decision matrix was created to weigh each alternative against the evaluation criteria. This produced a preferred method for developing the system.)

The evaluation criteria for selecting an alternative follow:

1. Conforms with "Backcountry Report."

2. Affordable both for the prototype and for the entire Region in the future.

3. Understandable to the public and imparts knowledge that allows users to make better judgments about backcountry travel.

4. Accepted by the public.

5. Expandable for the Region.

6. Can be adapted to a feedback system for gaging public acceptance.

7. Internally acceptable--District Rangers willing to use the system where necessary. This also includes the factor of liability.

List of alternatives for the Hazard Rating System:

A. Mapping of terrain only.

B. Forecasting avalanche hazard to the specific terrain.

C. Using the Colorado Avalanche Information Center forecasting system and posting the forecast on the prototype bulletin boards.

D. Identifying and physically marking each avalanche path within the area served by the bulletin board (This alternative was eliminated from further consideration. The group realized this was impractical from a cost and logistic standpoint).

E. Using the bulletin board to post generic avalanche awareness backcountry travel information.

F. Handing out materials developed specifically to complement any of the first five alternatives.

A decision matrix was developed and agreed upon by the group, including the weighting of the "YES, NO, AND NEUTRAL" categories. The evaluation criteria are numbered across the horizontal axis and alternatives are lettered on the vertical axis.

Decision Matrix

	Criteria							
Alternatives	1	2	3	4	5	6	7	**Total Pts.**
A	Y	0	Y	Y	Y	Y	0	19
B	Y	0	0	0	N	Y	0	13
C	Y	N	Y	Y	N	Y	N	15
E	0	Y	0	0	Y	Y	Y	18

Legend:
Y = Yes with a value of 3
N = No with a value of 1
0 = Neutral and a value of 2

Note: Alternative D was not given ratings because it was deemed impractical by the committee. Alternative F was not given ratings because the group recognized that it was an option that could be applied to each of the other alternatives. It did not lend itself to consideration in the matrix, but has value as an addition to any of the alternatives. The group also recognized that this matrix gave each evaluation criterion equal weight. For the sake of simplicity, a decision was made to proceed with this method and make a determination after the scores were totaled whether weighting criteria would be necessary. The group was comfortable with the results from equal weighting.

Alternative A was selected by numerical value. Alternative E, because of its high numeric value (it is also a "Backcountry Report" recommendation), will be included as part of the selected alternative.

After choosing Alternative A, the group agreed upon the criteria for picking the sites for the boards: (1) Area receives heavy backcountry use in winter; (2) area has moderate to high avalanche risk in an average season.

Three areas qualified: Vail/Shrine Pass area, Maroon Valley, and Castle Creek. Maroon Valley was dropped because the other two areas fit the criteria best. The Vail/Shrine Pass area is 5 miles west of Copper Mountain, Colorado, on Interstate 70. This trailhead is heavily used by cross-country skiers and snowmobilers. Because most snowmobilers leave the parking lot from a different location than do most cross-country skiers, two bulletin boards were needed. The Castle Creek area is 10 miles south of Aspen. It is a popular area because of several attractions. Ashcroft Ski Touring, Unlimited, is there, as well as several cross-country ski huts in the Fred Braun Hut System. It is also an area of uncommon beauty that draws a number of day skiers.

After deciding to map the avalanche hazard, the next step was to create criteria for developing the chosen method. The group did this by brainstorming criteria and then going back through the list and determining which criteria were valid. Asterisks indicate those used.

* 1. Optimum size of the area for mapping units.

* 2. Slope (30 degrees or greater is high, 20 to 30 degrees is intermittent, and less than 20 degrees is low hazard).

* 3. Understandable by the user.

* 4. Define the targeted audience.

* 5. Allowance for professional judgment.

6. Any area with 20 percent or more area in any hazard rating will automatically be put into the next highest category.

7. Areas of corridors that are reasonably "safe" will be identified on the mapping and will be selected through professional judgment.

8. Avalanche run-out zones will be included in the high hazard rating.

* 9. Area covered in each of the two chosen test areas (decision was to let each affected District decide area to be mapped).

* 10. Terminology to be used for the categories of hazard.

* a. High, Intermittent, and Low

b. High Risk, Low Risk, and No Risk

c. Use colors only, tied to percent chance of getting caught in an avalanche.

d. Spectrum of most hazard to least hazard.

* 11. Use photos of the actual terrain of the area to indicate examples of varying classifications of hazard. These will be visually tied to the mapping by color coded string.

12. Frequency.

* 13. Keep the information positive and avoid doom and gloom.

4. Brainstorm for ideas to include as support information bulletin board. (All items are listed as a result of the brainstorming. The items selected have an asterisk.)

* a. Sections of the Winter Travel Brochure.

* b. Colorado Avalanche Information Center phone number to get local avalanche advisory information.

* c. Forest Service standard avalanche poster (yellow and black).

* d. Legend for mapping.

e. Risk information.

f. Definitions of CAIC forecast hazard ratings of Extreme, High, Moderate, and Low.

* g. Phone number for users to call to give their opinion of the prototype.

h. Divide bulletin board into two types of information, Critical and Other.

5. Identify the audience who will be using the system. (Brainstorming again was used and the selected items have an *.)

* a. Spectrum of cross-country skiers.

* b. Snowmobilers.

* c. Users who have a minimum amount of experience in the backcountry.

d. Developed ski area ticket holders (support or complement the boundary management program of the ski area).

e. Hut system users.

f. Media.

g. Interstate 70 travelers (depends upon sign location).

6. Develop ideas for methods of evaluating prototypes this winter. (Brainstorming produced these suggestions and selected ones have an *.)

* a. Field observations on peak days.

b. Evaluation box.

* c. Volunteers to solicit answering of questionnaires.

d. Register board for further contact.

e. Outfitter guides.

f. Colorado Division of Highways.

7. Any other objectives desired by group. (No additional items were raised).

Marketing Plan

Between this first meeting and the selection of individuals who would help develop the Avalanche Awareness System, a marketing plan was developed to

spread the word about the system to the public and to the Forest Service. The plan included the following:

Goal

To formulate a plan to promote the project and its objectives (see objectives, pp. 3-4).

Action Items (results in parentheses)

1. Notify the District Ranger, Supervisor's Office, and the Regional Office of the project and get concurrence on the prospectus. (Got signature of my District Ranger and Forest Supervisor on the project prospectus, signed 10/22/87 and 10/27/87 respectively. Sent prospectus to Regional Office, John Korb, Winter Sports, December 12, 1988.)

2. Carefully select those persons to help develop the system. See "MEETING TWO" below.

3. Inform media in advance that a new emphasis on avalanche awareness exists in the State and get them interested in the project.

   --Paul Anderson, Aspen Times (Oct. 1987 and Feb. 1988).

   --Pat Bingham, KSPN Radio. (Jan. 1988 did recorded interview for airing during Avalanche Awareness Week.)

   --Arrange for Summit County newspaper coverage of the installation of the system at the Vail/Shrine Pass area. (This was done by Chuck Tolton and Ken Kowynia; Appendix A contains the article.)

   --Joe Garner, Rocky Mountain News, Denver. (Article resulted from 3 avalanche deaths in Castle Creek on January 10, 1988) Appendix B.

   --Scott Broom, Channel 4, Denver. (Arranged for TV coverage during Avalanche Awareness Week - was not aired because of three avalanche deaths near Aspen, a higher priority.)

   --Arrange for Summit County TV coverage through Denver Channel 9. (Chuck Tolton arranged for coverage of bulletin board installation on Vail Pass for January 9, 1988. This, too, was never aired because the Denver Broncos became contenders for the Super Bowl.)

4. Keep Bob Miller, WRNF Recreation Staff Officer, informed of the status of the project. (Miller attended the October 20 meeting and was sent copies of results of subsequent meetings.)

5. Keep all participants informed after each meeting. (Documentation of each meeting was sent to each member within a

week after the meeting.) Send letters of encouragement to committee members (Appendix C).

6. Choose key people in the community, both Pitkin and Summit Counties, and brief them on project to gain support. Keep them in tune with the project's status. (Sent letter about the project to local backcountry guides and enthusiasts, county officials, etc., and ask them for their input in evaluating the project; see letter to reviewers with accompanying mailing list, (Appendix D). Letter was mailed out on November 12, 1987.

7. Involve knowledgeable locals in the hazard mapping:

   --Chuck Tolton, Patrol Director at Copper Mountain
   --Nick Logan, Colorado Avalanche Information Center
   --Knox Williams, Colorado Avalanche Information Center
   --Ken Kowynia, Dillon Ranger District
   --Rob Burnett, Tenth Mountain Trail Asssociation
   --Lou Dawson, Backcountry Guide and Author
   --Rick Schloss, Resolution Snotours, Inc.

   (All participated in the mapping exercise except Knox Williams, who requested that Nick Logan represent the CAIC.)

8. Send out letters with attached questionnaires the second time to same reviewers list as in item 6 above (see second letter and questionnaire as Appendix E).

9. Develop questionnaires for interviewing users at trailhead displays and arrange for Forest Service people to conduct interviews on weekends (see questionnaire, Appendix F).

10. Keep Regional Office informed of progress of project. (Have kept Denny Bschor and John Korb informed by personal contact.)

11. Send letter to Chuck Tolton's supervisor at the Copper Mountain Resort, thanking him for Chuck's participation (Appendix G).

12. Notify the Colorado Search and Rescue Board of the project (Appendix H).

13. Assist Chuck Tolton in providing information materials, etc., for his boundary signing of the Copper Mountain Ski Area (delivered materials to Tolton, February 1988).

MEETING TWO - NOVEMBER 17, 1987

In choosing the people to help implement the preferred method for developing the Avalanche Awareness System (as selected at the first meeting), the objective was to select people with a variety of skills. The project needed people with expertise in snow science. It was important to choose people in this field who also had these attributes:

* Genuine interest in improving winter backcountry safety.

* Interest in helping with this project.

* Respect from ski industry and/or for work in an avalanche environment.

* Had key contacts in their respective communities.

* Located where getting to meetings would not be too difficult.

* Knew the general terrain where bulletin boards would be placed.

* Knew the clientele and the patterns of those who recreated in the area.

The people who agreed to assist in developing the selected alternative were Chuck Tolton, Ken Kowynia, and Nick Logan (an avalanche forecaster for the Colorado Avalanche Information Center and a ski patrolman at Breckenridge).

The meeting was held on November 17, 1987, at Copper Mountain. The meeting began with a list of objectives. Discussion on results of the objectives follow:

1. Develop draft mapping of avalanche hazard for Vail/Shrine Pass area.

   The group first considered using the computer mapping of slope ranges, but found more comfort with the USGS quadrangle maps and applying professional judgment along with using the contours (see Appendix I for example of computer generated slope angle mapping). The criteria established in the October 20 meeting was followed with the exception of the first criterion. It was vague, and a decision was made to make the mapping units general in nature, which meant areas would exist within each category that varied from the hazard rating.

   The hazard mapping was approached by applying the general guidelines of using slope angle ranges of 0-20 degrees, 20-30 degrees, and greater than 30 degrees (Fredston and Fesler, xxxx). (For the sake of simplicity, the group decided to not mention that slopes greater than 45 degrees are not as hazardous because they tend to avalanche much more frequently. This frequent avalanching does not allow for snowpack buildup and therefore the hazard of a sizable avalanche is less). A decision was made as to which drainages in the Vail/ Shrine Pass area should be mapped. The perimeter of the area to be mapped for slope angle was outlined with a heavy black line. Ratings of large general areas by slope angle with a color code were made. Several areas were left uncoded until the group could discuss them with Rick Schloss, a snowcat skiing guide. He was more familiar with a few locations than the group. He was asked to verify the codes established for the other areas in the Vail/Shrine Pass area. A decision was made to eliminate the full-length corridors for two of the more popular skiing routes to help manage the size of the final map.

2. Develop narrative and legend for AVALANCHE TERRAIN MAP. The results of the discussion are reflected in the wording chosen:

   AVALANCHE TERRAIN MAP

   This map was developed as a pilot project as a result of the eleven avalanche related fatalities (two of which were in this area) on National Forest during the 1986-1987 winter season. It is a cooperating effort

including the U.S. Forest Service, Colorado Avalanche Information Center, the ski industry, backcountry guides and outfitters, and experienced backcountry enthusiasts.

OBJECTIVE: This pilot project is to map potential **AVALANCHE HAZARD** as related to **TERRAIN**. This map is intended as a tool to assist the backcountry user in his decision making for **ROUTE SELECTION**. It is also intended to increase **AVALANCHE AWARENESS** related to **SLOPE ANGLE**.

HOW TO USE THIS MAP: Colors on the map relate to ranges of **SLOPE ANGLE**. Use this information for **ROUTE SELECTION** and **AVALANCHE AVOIDANCE**.

RED: High Hazard....Avalanches are frequent. Hazardous under moderate or high avalanche warning forecasts.

YELLOW: Intermittent Hazard....Occasional avalanches, may include areas of high hazard.

BLUE: Low Hazard....Avalanches are unlikely.

3. Suggest items to be included on boards (will finalize during the next meeting on 1/24/87, at which time the group will look at content and how each item will be displayed).

After completing as much of the mapping as possible, a decision on how to break down the information to be included on the bulletin boards was made. The goal was to keep it simple while including the criteria chosen at the October 20 meeting. This meant further defining what Winter Travel Brochure information to include. The list was generated by brainstorming; asterisks indicate items selected.

* 1. Disclaimer (one that came from RO legal counsel or a simpler version developed by us).

2. State that the avalanche run-out areas were included in the red code.

3. Mention ski touring opportunities in the general area (Vail/Shrine Pass area).

4. Make some general statements about the difficulty of the Commando Run.

* 5. Reference the adjacent quadrangle maps on our coded map.

* 6. A description or legend of the color codes.

* 7. Mention 911 phone number for emergencies is used in Summit and Pitkin Counties.

* 8. List State avalanche information numbers.

9. Objective of bulletin board information.

10. Refer to guide books as a source of information.

* 11. Refer to closest telephone for emergencies.

* 12. Actual photos as examples of the three avalanche hazard ratings.

* 13. Include the triad information.

* 14. List the rules of thumb.

The group then decided how to display and categorize the selections made from the above list. These three categories were chosen: (1) Statement of objective and explanation of how project began; (2) how to use the provided information; (3) support information (information in addition to the slope angle coding that was to be kept to the right side of the display).

4. Look at Colorado Avalanche Information Center's avalanche photos and determine which to use to represent the different hazard rating categories. The CAIC's photos were reviewed but the group decided to take photos of the actual areas and use these instead. Nick Logan volunteered to take the photos of the Vail/Shrine Pass area, and Randy Herzberg will arrange for the Castle Creek area photos.

5. Look at other methods for evaluating the system before March 1988. Time ran out before this objective was reached and it was scheduled for the November 24 meeting.

Just before adjournment an action items list and assignments were made.

	Action item	Date	Who
1.	Finalize maps with Rick Schloss	11/24	Kowynia
2.	Collect components for bulletin boards	11/24	Herzberg
3.	Photos for classification examples	12/10	Logan Herzberg
4.	Map classification for Castle Creek	12/5	Herzberg
5.	Meeting at Copper Mountain to finalize bulletin board display design	11/24	Logan Tolton Kowynia Herzberg Schloss

MEETING THREE - NOVEMBER 24, 1987

Meeting Objectives

Objective 1 - Finalize hazard mapping for Vail/Shrine Pass area.

With Rick Schloss, the group completed the hazard mapping and sized the map to our space on the board.

Objective 2 - Display and finalize contents of bulletin boards.

The information was mocked up in a frame the same size as the actual bulletin boards and each piece of information was discussed in relation to location, size, color, and message. The group carefully kept the mapping information and the support information separated to the two different sides of the boards. Each piece was located, based on how a potential user would view it, i.e., from the top left first. The mapping side of the display was emphasized by labeling it "AVALANCHE MAPPING SYSTEM" in 4 inch letters. The other half of the board was de-emphasized by using 3 inch letters labeling it "Support Information". The group chose white letters on a blue background, feeling that those colors are synonymous with information (such as highway signs, etc.). The text was sized to make the most important information eye-catching. Items of lesser importance such as the liability disclaimer were reduced.

Objective 3 - Discuss photos for illustrating hazard ratings, merits, and problems.

Some of the problems identified with the use of photos to further emphasize the terrain hazards included:

- Difficulty in getting photos to show actual slope angle.
- Added confusion by showing different photos indicating different hazards (technically there can be as little as 11 degrees difference from a low hazard to high hazard).

Merits of photos include:

- Gives user a feel for terrain in each hazard rating.
- Shows that small areas can be potentially hazardous.
- Shows that areas of higher hazard exist in general areas of less hazard.
- Photo will be an eye-catcher and is an efficient way to get the message delivered (a picture is worth a thousand words).

A decision was made to use the photographs on a trial basis.

Objective 4 - Determine if a method to post daily avalanche hazard rating from the Colorado Avalanche Information Center is to be used.

After considering the possibility of posting the daily avalanche hazard rating from the CAIC, the idea was dropped the idea for these reasons:

- Requires daily changing of the information by someone.
- Method would need to be tamperproof.
- Requires consistent posting of the message to have credibility.
- Would have to be posted early each morning - very labor intensive.

Objective 5 - Discuss and determine best methods for evaluating system.

The two most reliable methods for evaluating the system decided upon were: (1) Post the phone number of the Ranger Station and encourage users to call in and comment. (A folder would be set up for the Dillon and Aspen RD's to record comments.) (2) Arrange to have Forest Service employees and/or other interested parties collect data at the sites.

Objective 6 - List action items for completion of bulletin boards.

Action Items

1. Color final maps and add adjacent map quadrangle reference - Logan.
2. Order white letters for headings - Herzberg.
3. Design a sample form for questioning users - Herzberg.
4. Deliver bulletin boards to Ken - Herzberg.
5. Develop bulletin board structure bracing for display at Vail/Shrine Pass area - Herzberg.
6. Send Herzberg a copy of the Vail mapping for sample to help with Castle Creek area - Logan.
7. Finalize components for installation - Herzberg.
8. Plasticize components before installation - Herzberg.
9. Make extra components to replace damaged ones - Herzberg.
10. Check on getting maps copied in color or printed - Logan.

MEETING FOUR - DECEMBER 4, 1987

Rob Burnett, Tenth Mountain Trail Association (cross-country hut system), and Lou Dawson, backcountry guide and author, were used to help map the Castle Creek drainage for avalanche hazard as the group had done for the Vail/Shrine Pass area. Both men are quite familiar with the terrain.

Meeting Objectives

1. Review bulletin board information items and their rationale to give Rob and Lou a better understanding of the intent of the project and how the information would mesh with the mapping the group was about to do (completed).

2. Develop a map perimeter for the Castle Creek area (completed).

3. Map the chosen area for hazard ratings. (The group soon discovered a major problem applying our hazard rating system to the Castle Creek area. Many locations, despite low and moderate slope angles, are unsafe because they are subject to avalanche run-out.)

   Since our hazard ratings were based on slope angle, the mapping was indicating areas of low and moderate hazard that were in fact very hazardous under high avalanche danger. Changing our basic premise away from just slope angle or coming up with a fourth classification were the options. Wanting to stay with slope angle as much as possible, the group elected to use a fourth category, Avalanche Run-out Zone. This category was depicted on the map in the same color as the high hazard (red) but with crosshatching. After making this adjustment, the mapping became much easier, and the group felt better about the results.

4. Determine the best bulletin board location for the test area. A number of locations were considered. The site chosen is on the public access road at the upper end of Ashcroft Ski Touring Unlimited (a cross-country ski area with developed trails and set track). Anyone proceeding past the developed area would be made aware of the terrain and avalanche hazard. The is also visible to virtually every visitor who planned to go into the upper Castle Creek drainage.

METHOD OF DISPLAYING INFORMATION

A suggestion had been made in the "Backcountry Report" to use a bulletin board system already in use on the White River National Forest for trailheads. A list of criteria necessary for the type of board to fit the needs in a winter environment was developed.

1. Attractive to draw users to the information.

2. Rugged construction to withstand snow and high winds.

3. Meet the display needs for the type and amount of information to be shown (especially able to display the chosen test areas on an actual USGS topographic map).

4. More efficient to modify existing bulletin board than to design a new one for this project.

Items 1 and 3 were easily met and some modification of the existing trailhead boards would make them meet items 2 and 4.

Blueprints for the bulletin board system are included in the recommendation package to the Regional Office.

The Castle Creek bulletin board was installed on January 6, 1988, and the Vail/Shrine Pass area boards on January 13, 1988. A photo of the final product is shown as Appendix J.

CHAPTER 4 - DISCUSSION

This chapter reviews the reactions of several groups to the project and some specifics from the evaluation process. The groups are divided into three categories: (1) general backcountry users; (2) the group chosen to formally review the project; (3) Regional Office personnel, who will decide on whether to adopt the Avalanche Awareness System on a Region-wide basis.

Backcountry User

A questionnaire was developed to gather feedback. The tallied results from the questionnaire were summarized and correspond to the numbering on the questionnaire:

1. The average self-assessment of this group's knowledge of backcountry travel safety on a scale of 1 to 5 (5 being most knowledgeable) was 3.75. The number of questionnaires filled out was 28.

2. Paraphrasing the consensus of "what information on the board was most valuable," the two most common mentioned items were the color coding of the slope angle and the mapping. This is very positive feedback, because one of our objectives was to draw people to the map with its color coding first. Without exception these were the only two items mentioned in this question.

3. 27 out of 28 said that nothing should be removed. One person said to remove the phone numbers.

4. 11 out of 28 said to add nothing. Other responses included:

    Current updates on avalanche danger (3)
    Ten essentials
    Commonly used trails (2)
    What equipment you should have and more on snow physics
    Thermometer
    Legend for USGS map
    A telephone
    More pictoral information
    Distances for trails and difficulty
    Weather/snow warnings
    Tips on what to do if you get caught in an avalanche
    Number of times an area slides per year
    Pamphlets container

5. 26 out of 28 said there was nothing confusing on the board.
The two comments received were:
    The variables of avalanche potential could use more explanation
    Too much printed material

6. Other comments were:

- Thanks
- I hate snowmobiles
- Commendable effort-thanks
- It would be good to have distance markers
- Great idea for backcountry information, directly related to this terrain, I believe it will be used a lot.
- Trails for cross country skiing should not be shared with snowmobilers
- Good idea (2)
- Place board at trailhead (Castle Creek)

As part of the evaluation process, phone calls from visitors to the boards were solicited as part of the information posted. A folder for documenting calls received was prepared for the Dillon and Aspen Ranger Districts. No calls were received.

Formal Reviewers

A similar questionnaire was sent out to the list of formal reviewers. A summary of their comments follow.

This portion of the evaluation went poorly. After sending two letters out on the project to each formal reviewer only two responses on the questionnaire were returned.

Summarizing the comments received from this group found agreement that the most valuable information was the mapping as it relates to slope angle. One reviewer felt the information had a positive impact and was simple enough for use. The other said that the language was not as severe as it should be.

Both reviewers commented about confusing items. The first comment thought that the nearest telephone location was confusing to a person unfamiliar with the area. The second comment called for stressing that avalanche awareness should be dealt with from a small party's point of view. He felt that the emphasis should have been on evaluation, preparedness and rescue techniques.

Suggested additions to the board included the information that snowcats are in operation in the area. This would serve two purposes, to warn skiers and snowmobilers that they were in the area and that in case of emergency, they have first aid supplies and medical expertise. The other suggestion was to inform the users that they should have rescue equipment with them and know how to use it.

The single comment for removing information was on the location of the nearest phone for emergency. The rationale was that they were using the nearest phone to call the Forest Service Avalanche Advisory. He felt that if they didn't know the hazard before they arrived, they shouldn't be there.

Under the additional comments, "I think the location of the board at Vail Pass is very good. It is informative and we have noticed a lot of people going over to study it."

Regional Office

Direct involvement from the Regional Office has been limited to the first scoping meeting. The Director of Recreation and Lands is aware of the project and its status, and the Regional Forester has been advised of the project. The Regional Forester was present when the author gave a 20-minute presentation to the Colorado Outdoor Recreation Resource Project Steering Committee February 18, 1988, to help promote the project. This group is made up of State and Federal officials. The final recommendations from the project were given to the Regional Office for use in selected areas within the Region.

CHAPTER 5 - SUMMARY

A comparison of the results of the project to the original objectives stated in Chapter 1 was conducted. Some additional benefits were also recognized. The first objective was to develop an Avalanche Awareness System that would educate backcountry users about the hazards of the terrain. This would allow them to make informed judgments about winter backcountry travel. Based on questionnaire responses and interviews with backcountry users, the project has accomplished this objective.

The second objective was to get the Rocky Mountain Region to use the system in selected locations in future winters. The Regional Office will make a decision on implementing the system after a thorough review.

The third objective was to demonstrate to the public and the ski industry that the Forest Service is acting on this serious problem and has developed a system to deal with it. Final judgment on whether this objective was achieved will depend in part on the Regional Office decision. However, a great deal of interest has been generated on avalanche awareness this winter through some combined efforts in which this project was a part. Newspaper, radio, and television coverage was widespread, especially during the Colorado Avalanche Awareness Week declared by Governor Romer (January 11-18).

The fourth objective was to draw on the interest and expertise of the backcountry user and the avalanche community. This has exceeded my expectations. Strong support from the Aspen and Summit County areas was received. Members of the committees, local backcountry enthusiasts, the Colorado Avalanche Information Center, Copper Mountain Resort, and Resolution Snocat Tours have all contributed to the project. The expertise of the committee members along with their enthusiasm has added credibility to the system.

Additional benefits include being a part of the new emphasis Statewide on avalanche awareness. As part of this effort, the Forest Service has received some very good press and the general level of awareness in the State has risen and is expected to continue to do so. Installation of new boards in other locations and other Ranger Districts is a good focus for drawing attention to avalanche awareness. The media in most cases is happy to cover a story like this.

The cost of materials and the labor involved in constructing the bulletin boards can add up to several hundred dollars. Estimates of materials cost approximately $200 each. Labor will vary, but about 15 to 20 hours is required for each bulletin board. A rough estimate for a completed board is $350-$400. In addition to construction costs, gathering and preparing the information for the boards can be time consuming. Installation and maintenance of the boards

over the winter months must be done. Removal of the boards after the winter is recommended, adding to the total cost.

The cost/benefit of the project placed in an appropriate area is quite positive. Comparison of the good press for the Forest Service and the number of people contacted in a positive fashion in most cases will outweight the small investment. If one rescue effort or death is prevented the cost saved in just funds alone is far greater that the cost of the project. Costs to the Forest Service and the Search and Rescue organizations are very high as supported by the recent deaths in Colorado. Use of the system is cost effective, even without consideration for the value of human life.

Development of the mapping system requires some knowledge of avalanche theory and of the terrain. While this expertise is not available on all Ranger Districts, it could be made available since avalanche awareness is such a high priority.

RECOMMENDATIONS

1. The Regional Office accept the Avalanche Awareness System for future use in the two test locations, Castle Creek near Aspen and Vail/Shrine Pass area in Summit County.

2. The Forest Supervisor, White River National Forest accept the Avalanche Awareness System for future use in the two test locations.

3. The Regional Office inform other units of the availability of the package for the development of a system on their Ranger District where appropriate.

4. The system should be placed in areas which have an average of 25 visitors per day on weekends and have a general avalanche hazard of moderate to high (This is only a guideline and the District Ranger will make the final decision).

5. The White River National Forest continue to monitor and document the effectiveness of the two test locations for the next two winter seasons.

6. Any new locations where the system is installed should be monitored for effectiveness for at least two seasons.

7. The White River NF keep this package for distribution to other units. Most of the information is stored on a diskette for use with their Hewlett-Packard computer.

BIBLIOGRAPHY

Author	Source
	Avalanche Handbook, 1976 (revised 1978), USDA Forest Service Agriculture Handbook 489
Caskey, C., 1987	Class notes. How to emphasize, intrinsic methods-occasional one sentence paragraph.
Caskey, C., 1987	Frugal Me, Frugal Me. Copyright 1985, The R.L. Bryan Co. Columbia, S.C.
Coutant, G., 1987	Quote from lecture, "What is your audience?"
Fredston, J. and D. Fesler	Snow Sense, 1984, Alaska Department of Natural Resources.
Hronek, B., 1987	A Recreation Managers Look At Torts", p. 10, "The law distinguishes between persons going onto the undeveloped land and persons entering the land for business reasons, to use recreation facilities, or under permit. For those coming onto the undeveloped land for pleasure, the duty to make safe or to warn of dangerous conditions applies only to unsafe conditions which the Forest Service knows about."
McDonald, M., 1985	Time, Can You Really Manage It?, p.2
Schreyer, R., 1987	Quote from lecture, "Recreation resource management should consider diversity, fairness, alternatives, and freedom."
Schreyer, R., 1987	Quote from lecture, "People are attracted to positive outcomes and avoid negative outcomes."
Syme, J., 1987	Class notes. "Importance of marketing determines the success or failure of all organizations. Marketing focuses on the needs of the target customers."
Syme, J., 1987	Class notes. Elements of strategic planning.
Williams, K. and B. Armstrong	Snowy Torrents, Copyright 1984, Teton Publishing Co., Jackson, Wyoming.

LISTING OF APPENDIXES

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A	"The Summit Sentinel" Article
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Officials progress with back country education efforts

by Mark Craddock
Sentinel Editor

They say an ounce of prevention is worth a pound of cure.

But, when the problem is tons of snow careening out of control down a slope, prevention means education. And it is more than the best medicine — it is the only cure.

In the wake of last year's 11 statewide avalanche deaths, the U.S. Forest Service and several private entities have started an information program aimed at preventing another plague of "white death."

The cornerstone of the project is a recently erected avalanche information board posted at the Shrine Pass trailhead at the Vail Pass rest area on Interstate 70.

The board, a joint undertaking of the forest service, Colorado Avalanche Information Center, local ski areas and private outfitters, provides the backwoods recreationalist with loads of information on potential avalanche conditions.

It features a map of the Shrine Pass region, color-coded according to slope angle to show safe, potentially hazardous and dangerous terrain.

Terrain with a slope angle below 20 degrees is colored blue. This terrain is essentially flat — a safe bet regardless of the prevailing avalanche conditions.

Areas with a slope between 20 and 30 degrees are shaded yellow. These slopes may see avalanches during high danger periods or may be close enough to steep slopes that they bear caution.

'Snowpack and weather patterns contribute to the avalanche danger, but terrain is the only constant...'

Slopes with an angle of 30 degrees or more are marked in red. These are areas of potentially high avalanche hazard and people venturing into the area should know what they're doing.

The hope is that the color scheme will become the standard at least throughout the state, so that even first time visitors can make sense of it.

Copper Mountain ski patrol director Chuck Tolton, one of the originators of the information board, said that slope angle is not the only barometer of avalanche danger, but it is the one factor that does not change.

"Essentially, what we're after is identifying terrain features as they relate to avalanche hazard," he said. "Snowpack and weather patterns contribute to the avalanche danger, but terrain is the only con-

from AVALANCHE page 3

Sentinel photos by Mark Craddock

Chuck Tolton and Ken Kowynia show off the new signage at the Shrine Pass trailhead.

AVALANCHE:

AVALANCHE from page 1

stant, it doesn't change.

"It is well known that avalanches occur more frequently on slopes above 30 degrees."

By basing their map on slope angle, they hope to provide a "ready reference" that will be pertinent despite variable factors such as weather conditions and snow depth.

Dillon Ranger District winter sports forester Ken Kowynia said the information should be useful to both those who want to avoid high-danger slopes and those seeking an adventurous Alpine back country experience.

Tolton said, "There are a lot of people who do not want to intersect an area that is slide prone. This gives them a quantifiable avenue of evaluation.

"But there is a second group — those who, perhaps, are more advanced and are looking for a more ambitious type of adventure.

"This gives them part of the information they need, in the hopes of furthering their thought process so they have a more complete idea of what they're getting into."

Kowynia said he sees the signs as being a boon to local tourism efforts, not a device for scaring people away.

"Even in times of high avalanche hazard, there are areas of low hazard," he said. "So people don't have to stay home in Denver.

"Avalanches need not be something to be fearful of. Respectful? Yes. But fearful? Not necessarily, with some knowledge."

The Shrine Pass area is heavily used by both back country skiers and snowmobilers, and separate signs have been erected for each, Kowynia said.

The avalanche information board displays risk based on slope angle, via a color-coded map.

The Shrine Pass trailhead, just above the rest area, has a sign geared more toward skiers, while the area adjacent to the rest area parking has a sign geared toward snowmobilers.

Tolton said the information board is among the first of its kind in the state, and he hopes the idea catches on.

He said Copper Mountain will be installing a similar sign at its back country access point by next month and Kowynia said another similar board is in place in the Castle Creek area in Eagle County.

And Tolton hopes the idea will catch on.

"My hope is that, after it has been in place for a season, we'll get some feedback as to whether it has been valid, usable and what further information we can provide.

"I personally hope to expand it to include high-use trailheads in Summit County."

Kowynia encouraged anyone wishing to comment on the new signs to contact the Dillon Ranger District office in Silverthorne.

And Tolton praised the forest service for the approach it has taken in dealing with the avalanche problem.

"I really applaud the efforts of the forest service in taking a proactive stance on what has happened.

"It tells me that 11 deaths last season, six of them in Summit County, were not for nothing.

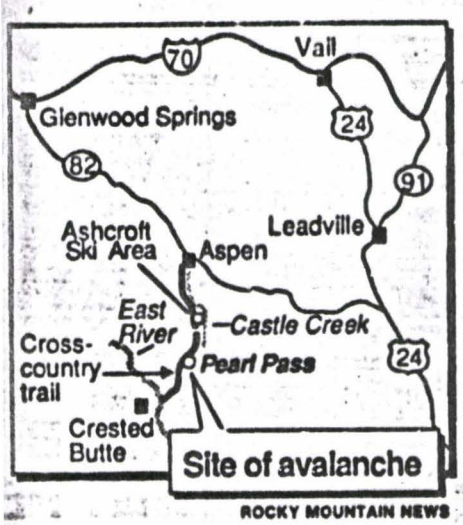
"(And) we're seeing a spirit of cooperation in Summit County that is absolutely unprecedented, all directed toward the winter enthusiast."

APPENDIX A

From the:
Summit Sentinel
February 3, 1988

APPENDIX B

From the Rocky Mountain News, January 12, 1988



ROCKY MOUNTAIN NEWS

Ignoring mountain hazards can cost lives, experts say

By JOE GARNER 1/12/88
Rocky Mountain News Staff Writer

SILVERTHORNE — Randy Herzberg, winter sports administrator for the Aspen Ranger District, understands the difficulty of protecting mountaineering enthusiasts from themselves.

"We can only do so much to warn or educate people," Herzberg said yesterday about the deaths Sunday of two experienced back-country skiers southwest of Aspen. A third skier is still missing.

Traditionally, public lands have been open for public use. But that philosophy has come under scrutiny because of the increasing number of fatal accidents involving mountaineers who, pushing higher and deeper into the back country, were not prepared for its rigors.

"People are not giving the mountains the respect they deserve," said snow ranger Sammy Somrak, a native of Crested Butte who has worked for the U.S. Forest Service in Colorado's mountains for 27 years.

"Who can figure people?" Somrak said. "They either underestimated the conditions or they played Russian roulette with the idea that 'It won't happen to me.' That attitude is getting people into trouble."

The 1986-87 winter was the worst for avalanche deaths in 81 years, according to the Colorado Avalanche Information Center. Eleven people died in six accidents.

"If the last two winters haven't driven home the reality of what can happen to you in the back country, it sure should," said Knox Williams, director of the Colorado Avalanche Information Center in Fort Collins. "Avalanches are pretty evil things. If you don't respect what winter can do to you, you'll be its victim."

In Sunday's accident, the three skiers caught in the avalanche surely had passed a yellow and black Forest Service sign posted in the middle of the trail that warned of the avalanche hazard, Herzberg said.

"The only public access is right up the canyon. The risk is high in that drainage, so we took extra precautions," Herzberg said. "Either they had sized up the risk and decided to go on, or they didn't recognize the risk. I can't think of any other options."

In addition to the yellow and black sign, maps were posted on a bulletin board 20 feet off the trail indicating areas of high, intermittent and low avalanche danger by a color code.

"I'm not sure they looked at (the sign and map), but they were there for them to see."

Skiers who challenge high mountain passes and isolated basins deep in fluffy, untracked powder take extra risks, Williams said.

"It used to be that chasing gold was a pretty strong aphrodisiac," Williams said. "Now, chasing powder is the aphrodisiac."

United States Department of Agriculture
Forest Service
White River National Forest
Aspen Ranger District
806 West Hallam
Aspen, CO 81611

Reply To: 1500

Date: November 12, 1987

Mr. Chuck Tolton, Director of Ski Patrol
Copper Mountain Resort
POB 3001
Copper Mountain, CO 80443

APPENDIX C

Dear Chuck:

I spoke with Ken Kowynia on Noverer 7th and he told me that you two had had a chance to talk about the Avalanche Awareness System. I just wanted to thank you for your support and enthusiasm on this project. Ken told me that you are still very interested in helping us out with the project.

I wanted to bring you up to date on some of things taking place. The computer work identifying the different slopes has been done and is in the mail to myself and Ken for our respective Districts. We will have a chance to look the printouts over and then get together to decide how we will color code them or some other method of displaying them. I am arranging for the construction of one of the bulletin boards for Aspen and two for the Dillon District.

I understand from Ken that the Colorado Avalanche Information Center may have some photographs in which we can use as examples of the varying terrain slopes. This may be particularly important this year because of the late snowfall.

Thanks again for your support and I'll be keeping you updated as things progress.

Sincerely,

Randy

Randall R. Herzberg
Winter Sports Administrator

United States Department of Agriculture | Forest Service | White River National Forest | Aspen Ranger District
806 West Hallam
Aspen, CO 81611

Reply To: 1500

Date: November 19, 1987

Jim Gentling
Arapahoe Basin Ski Area
P.O. Box 38
Keystone, CO 80435

APPENDIX D

Dear Jim:

You are probably aware of the study the Forest Service conducted this past spring and summer on our policy and procedures dealing with winter backcountry access. If you are not aware of the findings of that Backcountry Report and are interested in a copy please give me a call. Two of the important recommendations coming from that report were:

1) Develop a system of classifying avalanche hazard, based on terrain factors. This system should be tested during the 1987-1988 season at a limited number of areas where heavy backcountry use occurs.

2) Increase the public's awareness and education on avalanche hazard.

I have recently returned from a Recreation Management Short Course at Clemson University. As part of that schooling, I will be working on a field project. I have chosen a project to help with the two recommendations above.

My objectives for this project include:

1) To develop a useful avalanche awareness system which will be beneficial to the backcountry user.

2) To get acceptance from the Forest Service's Rocky Mountain Region (mainly Colorado and Wyoming) to be used throughout the Region in future winters.

3) To demonstrate to the public that the Forest Service is taking action on a serious problem and is working on a system to help educate the backcountry user.

4) To utilize the interest and expertise of the backcountry user and the avalanche community in assisting me in the development of this project.

I am asking for your help in evaluating the project in the field. Please take a close look at the bulletin boards when you are in Castle Creek or the Vail Pass areas this winter. I am very interested in your feedback for what you think is positive, what concerns you may have and what changes for improvements you would like to suggest. I am writing to you now to let you know that I am working on my objectives and will have the prototype in the field by early December. This prototype was developed by a committee which included Chuck Tolton, Patrol Director at Copper Mountain, Knox Wiliams, Director of the Colorado Avalanche Information Center and several Forest Service people. It consists of a bulletin board with several types of information. It will include mapping of the terrain to indicate areas of hazard by terrain only. It will have other information such as a legend for the mapping, local phone numbers for Forest Service Avalanche Information, and other pertinent information about backcountry travel. It will serve as a prototype for the Rocky Mountain Region and I am planning to have three bulletin boards for this winter. One will be in Castle Creek near Ashcroft Touring Unlimited, Inc. (just south of Aspen) and two on Vail pass just west of Dillon, CO.

Please call the respective Ranger Station for the bulletin board that you visit. For the boards on Vail Pass, contact Ken Kowynia at the Dillon Ranger Station (468-5400) or Randy Herzberg at the Aspen Ranger Station (925-3445). If we are not in the office when you call, please leave a name and number where we can reach you. Your input on this project is valued and is important to making the final product a useful tool for the winter backcountry traveler. I am looking forward to working on this project and I am hopeful that you will take the time to assist me.

Sincerely,

Randy Herzberg

RANDY HERZBERG
Winter Sports Administrator

FORMAL REVIEWER'S MAILING LIST

1. Boots Furgeson
   Holland and Hart
   600 E. Main
   Aspen, CO 81611

2. Julie Mace
   POB 1048
   Aspen, CO 81612

3. Bob Miller
   White River National Forest
   POB 948
   Glenwood Springs, CO 81602

4. Lou Dawson
   2858 Woody Cr. Rd.
   Woody Creek, CO

5. Rob Burnett/Jim Ward
   Tenth Mountain Trail Association
   1280 Ute Ave.
   Aspen, CO 81611

6. David Scwersky
   Mountain Rescue
   630 W. Main
   Aspen, CO 81611

7. Kim Carpenter
   Ashcroft Ski Touring
   POB 1572
   Aspen, CO 81611

8. Judy Botinovch
   POB 10424
   Aspen, CO 81612

9. Bob Braudis, Sheriff
   506 E. Main
   Aspen, CO 81611

10. Fred Braun
    USSA Hut System
    702 W. Main
    Aspen, CO 81611

11. Paul Anderson
    Aspen Times
    310 E. Main
    Aspen, CO 81611

12. Rick Schloss
Resolution Snowtour
POB 2191
Vail, CO 81658

13. Delbert Ewolt, Sheriff
POB 210
Breckenridge, CO 80424

14. Harry DeWitt and Gavin Wills
Colorado Heli Ski
POB 64
Frisco, CO 80443

15. Kevin Ahern
Breckenridge Ski Area
POB 1058
Breckenridge, CO 80424

16. Jim Gentling
Arapahoe Basin
POB 38
Keystone, CO 80435

United States Department of Agriculture | Forest Service | White River National Forest | Aspen Ranger District
806 West Hallam
Aspen, CO 81611

Reply To: 6700

Date: January 20, 1988

mADDn

APPENDIX E

Dear mNAMEn

This is a follow-up to the letter I wrote you in November concerning the Avalanche Awareness System I have been working on this winter. Through a great deal of cooperation with a number of you who work and recreate in an avalanche environment, we have compiled the information and constructed the bulletin boards for this project. The board for the Castle Creek drainage, south of Aspen was installed on January 6th and the two for the Vail Pass area were put up on January 15th. The job remaining is to evaluate the boards and determine what changes should take place, so I can recommend a final version to the Forest Service Regional Office. This final version will be used in other backcountry locations in future winters. My report is due in early March.

Because of your background and interest in educating the backcountry skier, I am asking you (if you have visited one of the boards) to take several minutes to fill out the enclosed questionnaire and return it to me in the self-addressed envelope by February 19th. If you have any questions, please phone me at 925-3445 in Aspen or Ken Kowynia at the Dillon Ranger District at 468-5400.

Sincerely,

RANDALL R. HERZBERG
Winter Sports Administrator

Enclosures

QUESTIONNAIRE FOR REVIEWERS ON AVALANCHE AWARENESS SYSTEM

NAME:

WORK PHONE:

HOME PHONE:

1. WHAT INFORMATION ON THE BOARDS DO THINK IS MOST VALUABLE TO THE BACKCOUNTRY TRAVELER?

2. DOES THE BOARD HAVE A POSITIVE IMPACT TO THE UNEDUCATED OR MODERATELY EDUCATED VISITOR?

3. WAS THERE ANYTHING CONFUSING ON THE BOARD?

4. WHAT INFORMATION WOULD YOU ADD TO THE BOARD?

5. WHAT INFORMATION WOULD YOU REMOVE FROM THE BOARD?

6. DO YOU HAVE ANY OTHER COMMENTS?

APPENDIX F

1. HOW WOULD YOU CLASSIFY YOURSELF AS TO YOUR KNOWLEDGE OF BACKCOUNTRY TRAVEL SAFETY ON A SCALE 1 TO 5 WITH 5 BEING MOST KNOWLEDGEABLE?

LEAST KNOWLEDGEABLE 1 2 3 4 5 MOST KNOWLEDGEABLE

2. WHAT INFORMATION ON THE BOARD WAS MOST VALUABLE TO YOU?

3. WHAT INFORMATION WOULD YOU REMOVE FROM THE BOARD?

4. WHAT INFORMATION WOULD YOU ADD TO THE BOARD?

5. WAS THERE ANYTHING CONFUSING ON THE BOARD?

6. DO YOU HAVE ANY OTHER COMMENTS?

7. WOULD YOU MIND GIVING US YOUR NAME AND PHONE, SO WE COULD CONTACT YOU AGAIN ON HELPING US FINALIZE THE BOARDS

NAME: PHONE:

United States Department of Agriculture | Forest Service | White River National Forest | Aspen Ranger District
806 West Hallam
Aspen, CO 81611

Reply To: 1500

Date: December 16, 1987

Mr. Al Roman, Vice President of Operations
Copper Mountain Resort
PO Box 3001
Copper Mountain, CO 80443

APPENDIX G

Dear Al:

I just wanted to drop you a line to thank you for allowing Chuck Tolton to participate in the development of the Avalanche Awareness System project I am working on. He has made a number of significant contributions to the project.

I am hopeful that you will eventually be able to incorporate most of the rationale and components of this system in your Boundary Management Plan for Copper Mountain. I know that when Woody was working on the development of the Backcountry Report and the Guidelines for the boundary manangement of the ski areas, he held in high regard the input of the ski industry and especially Chuck's ideas on the hazard rating system. Copper Mountain's support of Chuck in this effort and the use of your conference room has been a great help.

Sincerely,

Randy

Randall R. Herzberg
Winter Sports Administrator

United States Department of Agriculture | Forest Service | White River National Forest | Aspen Ranger District, 6 West Hallam, Aspen, CO 81611

Reply To: 1500

Date: November 12, 1987

APPENDIX H

Mr. Howard Paul
2460 Eliot St.
Denver, CO 80211

Dear Mr. Paul:

Through my association with the Forest Service's Backcountry Report I have been made aware of some of the activities being undertaken by the CSRB. I am very pleased and impressed with your efforts to bring more awareness to backcountry travel.

I am working on an Avalanche Awareness System for Backcountry Visitors as a project for a course I recently took at Clemson University. Because of your obvious commitment to the problem, I just wanted you to be aware of my project. I am excited about the emphasis put on this problem by a number of agencies and organizations this year.

I have enclosed a copy of the project prospectus for your information.

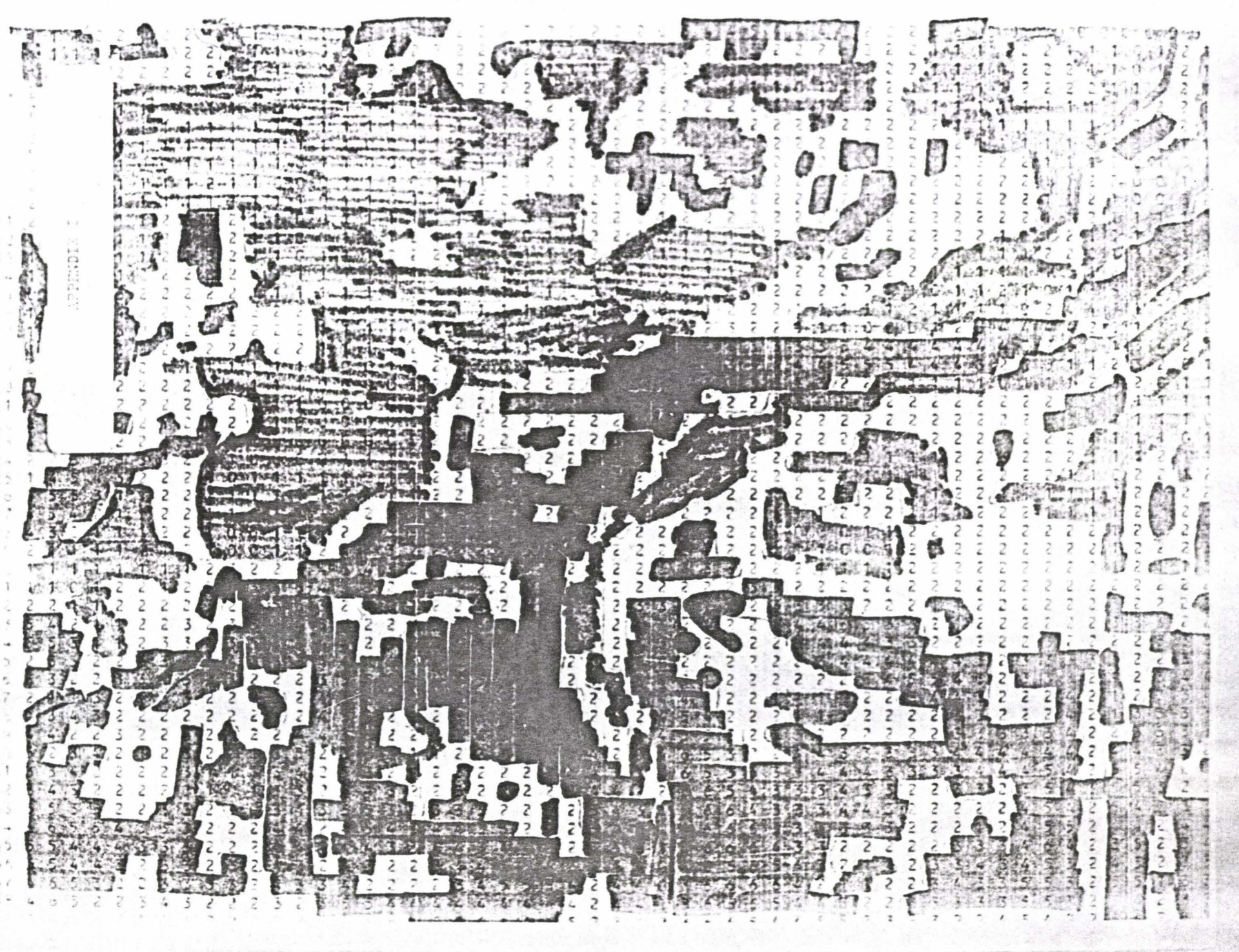
Keep up the good work.

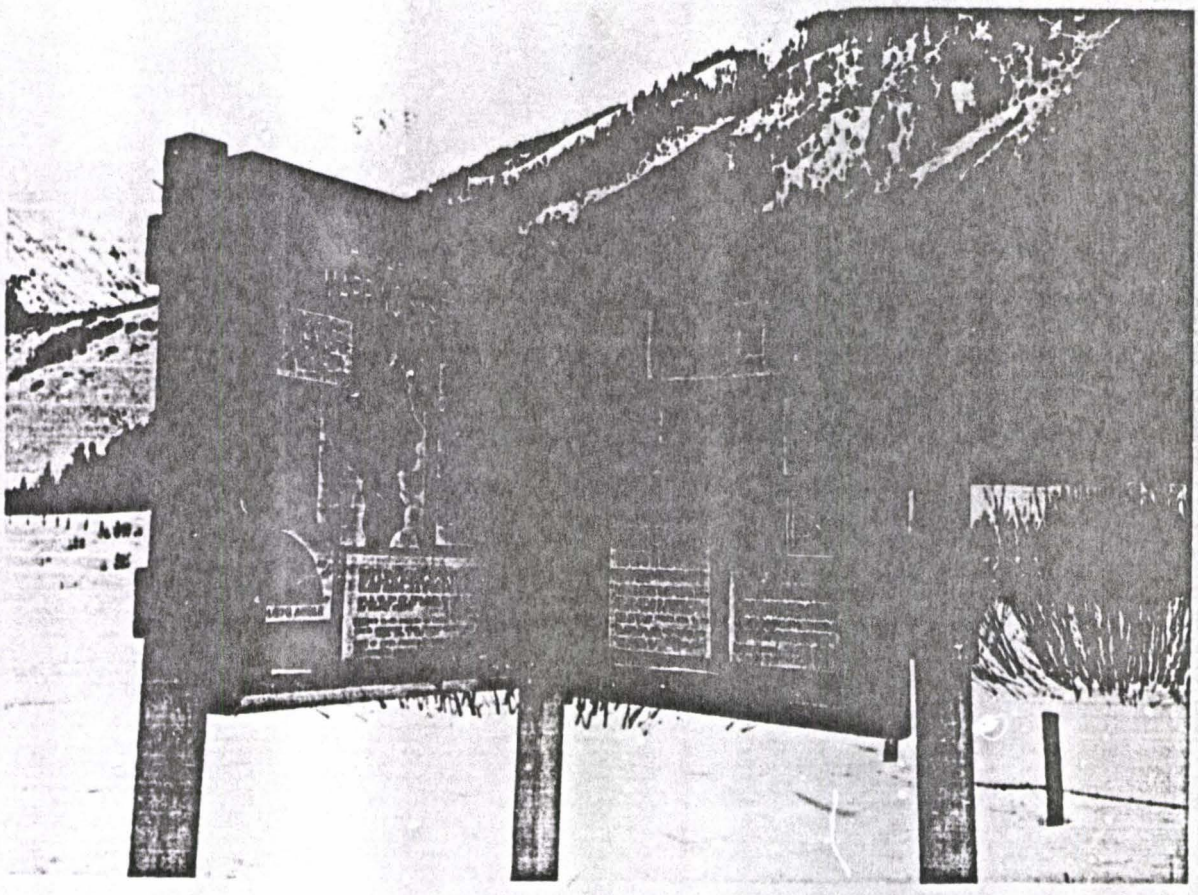
Sincerely,

Randall R. Herzberg

Randall R. Herzberg
Winter Sports Administrator

Enclosure



APPENDIX J

PHOTOGRAPH OF FINISHED PROJECT IN CASTLE CREEK NEAR ASPEN, COLORADO